

USA standard

**Take-Up Reels
for
One-Inch
Perforated Tape
for
Information
Interchange**

**USA Standard Take-Up Reels
for One-Inch Perforated Tape
for Information Interchange**

**Sponsor
Business Equipment Manufacturers Association**

**Approved August 10, 1967
United States of America Standards Institute**

USA Standard

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Foreword

(This Foreword is not a part of USA Standard Take-Up Reels for One-Inch Perforated Tape for Information Interchange, X3.20-1967.)

This publication contains the physical dimensions and tolerances of take-up reels for one-inch perforated tape. It is one of a series of standards relating to information processing systems, communications systems, and associated equipment.

The standard was developed by a group of highly qualified and experienced specialists in tape processing and communications. Historical work in the field was reviewed and forms the basis for this standard.

This standard was approved as a USA Standard by the United States of America Standards Institute on August 10, 1967.

Suggestions for improvement gained in the use of this standard will be welcome. They should be sent to the United States of America Standards Institute, 10 East 40th Street, New York, N. Y., 10016.

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It should be recognized that although X3.2 and X3.2.2 members are variously affiliated, work on a subcommittee or task group is achieved primarily on an individual competence and experience basis.

Contents

SECTION	PAGE
1. Scope	7
2. Physical Characteristics—Small Diameter Drive	7
2.1 General	7
2.2 Dimensions.....	7
3. Physical Characteristics—Large Diameter Drive (NAB Hub Type)	7
3.1 General	7
3.2 Dimensions.....	9
4. Definition of Terms	9
Figures	
Fig. 1 Small Diameter Drive	8
Fig. 2 Large Diameter Drive (NAB Hub Type)	8
Appendix	
A1. Two Reel Specifications	11
A2. Small Diameter Drive Reel.....	11
A3. Large Diameter Drive Reel (NAB Hub Type)	11
A4. Interchange Between Reel Sizes	11
A5. Specification of Tape Length	12

USA Standard Take-Up Reels for One-Inch Perforated Tape for Information Interchange

1. Scope

This standard covers the physical dimensions of take-up (or storage) reels, with either fixed or separable flanges, so that reels of perforated tape may be interchanged among machines of various manufacturers, and is intended to serve as a guide in the coordination of equipment design.

Two types of reel are specified. Both are intended for use with one-inch tape, the difference being in the size and shape of the drive hubs.

2. Physical Characteristics— Small Diameter Drive

2.1 General

2.1.1 This reel is to be driven by a half-inch spindle. The small hub size limits the permissible drive torque and acceleration but permits maximum tape capacity for any outside diameter (O.D.)

2.1.2 The reel mounting arrangement is symmetrical so that the reel may be attached to its drive system with either side out.

2.1.3 The reel shall have means for securing the tape to the hub and shall have suitable openings for access to the securing means.

2.2 Dimensions

2.2.1 The inside diameter (I.D.) of the hub shall be 0.505 inch plus 0.005 minus 0.004 inch.

2.2.2 The outside of the hub must be so constructed as to be circumscribed by a circle 2.000 in. plus 0.000 minus 0.062 inch in diameter. If the surface is not cylindrical, the effective radius shall not be less than 0.840 inch at any point.

2.2.3 A plane area called the platform seat, with a minimum diameter of 0.750 inch concentric with the hub inside diameter, is to be provided at each end of the hub. The platform seats are to be separated by 1.296 in. plus 0.031 minus 0.010 inch. The outside surfaces of the reel shall be free of axial projec-

tions beyond the planes of the platform seats over a minimum area 1.000 inch in diameter.

2.2.4 Outside the one-inch diameter platform seat clearance circle (see 2.2.3) the axial projection of any portion of the reel flanges beyond the plane of the platform seat shall not exceed 0.093 inch.

2.2.5 Three key slots shall be provided in each platform seat to engage a drive spindle latch. The slots shall be spaced 120 degrees plus or minus $\frac{1}{2}$ degree apart. The radial depth of the slots shall be 0.375 inch plus 0.015 minus 0.000 inch. The slot shall be 0.075 inch plus or minus 0.005 inch wide and 0.125-inch min deep axially.

2.2.6 Each of the two inner surfaces of the reel flanges shall lie between two datum planes separated by 0.093 inch and perpendicular to the true centerline of the hub. The inner datum planes shall be separated by 1.040-inch min and shall be centered between the platform seats within 0.010 inch. The inner surfaces of the flanges shall be smooth and free of burrs or sharp edges which could snag or tear the edges of the tape.

2.2.7 The outside diameter of the hub and the outside diameter of the flanges shall be concentric with the hub inside diameter within 0.062-inch total indicator reading.

2.2.8 The outside diameter of the reel shall be within plus or minus 0.062 inch of 6.000, 7.500, 8.500, or 10.500 in.

3. Physical Characteristics— Large Diameter Drive (NAB Hub Type)

3.1 General

3.1.1 This reel is to be driven by a 3-inch spindle and is to be suitable for operation at high speeds.

3.1.2 The reel mounting arrangement is symmetrical so that the reel may be attached to its drive system with either side out.

3.1.3 The reel shall have means for securing the tape to the hub and shall have suitable openings for access to the securing means.

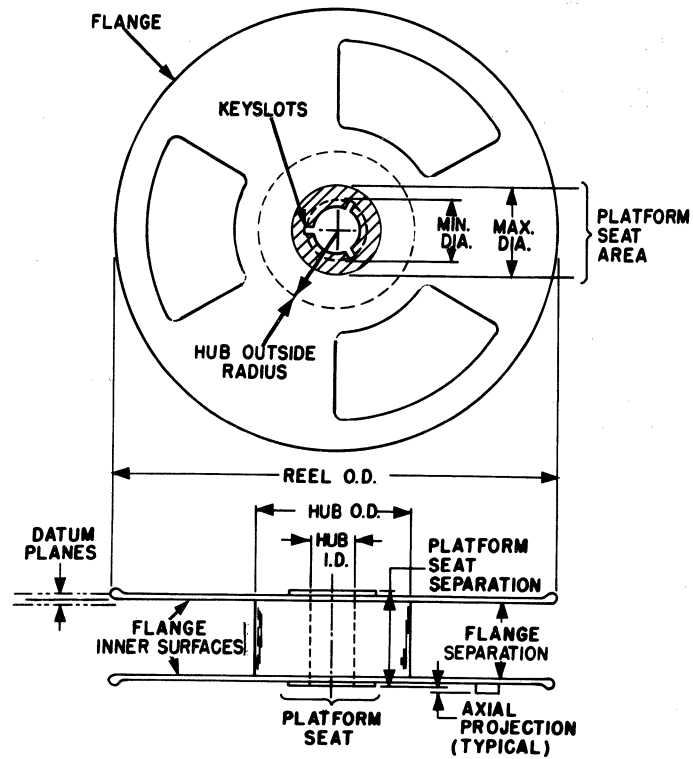


Fig. 1
Small Diameter Drive

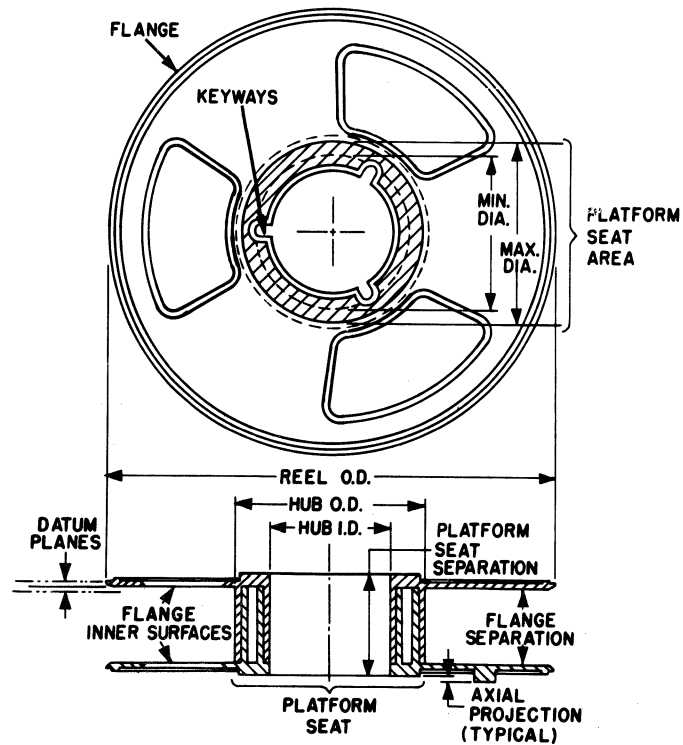


Fig. 2
Large Diameter Drive (NAB Hub Type)

3.2 Dimensions

3.2.1 The inside diameter (I.D.) of the hub shall be 3.000 in. plus 0.010 minus 0.000 inch.

3.2.2 The outer surface of the hub shall be cylindrical with a diameter of 4.500 in. plus or minus 0.015 inch and shall be concentric with the center bore within 0.031-inch total indicator reading.

3.2.3 The platform seats shall be at least 3.250-inch diameter and shall be separated by 1.196 in. plus or minus 0.010 inch. The outside surfaces of the reel shall be free of axial projections beyond the planes of the platform seats over a minimum area 3.875 in. in diameter.

3.2.4 Outside the 3.875-inch diameter platform seat clearance circle (see 3.2.3), the axial projection of any portion of the reel flanges beyond the plane of the platform seat shall not exceed 0.080 inch.

3.2.5 Three keyways spaced 120 degrees plus or minus 6 minutes apart, shall be provided for the entire length of the reel to engage drive spindle keys. The pitch diameter of the keyways shall be 3.250 in. plus 0.005 minus 0.002 inch to the center of the keyway radius. The width of each keyway is to be 0.219 inch plus 0.006 minus 0.000 inch.

3.2.6 Each of the two inner surfaces of the flanges shall lie between two datum planes separated by 0.030 inch and perpendicular to the true centerline of the hub. The inner datum planes shall be separated by 1.040-inch min and shall be centered between the platform seats within 0.010 inch. The inner surfaces of the flanges shall be smooth and free of burrs or sharp edges which could snag or tear the tape.

3.2.7 The outside diameter of the flanges shall be concentric with the inside diameter of the hub within 0.062-inch total indicator reading.

3.2.8 The outside diameter of the reel shall be within plus or minus 0.062 inch of 8.000, 10.500, or 14.000 in.

3.2.9 The appendix to this standard contains additional information on the design and use of the take-up reels.

4. Definition of Terms

The terms are defined as shown in Figs. 1 and 2.

Appendix

(This Appendix is not a part of USA Standard Take-Up Reels for One-Inch Perforated Tape for Information Interchange, X3.20-1967, but is included to facilitate its use.)

A1. Two Reel Specifications

A1.1 During Task Group consideration of the type of perforated tape reel required for interchange among machines of various manufacturers, it was determined that no one reel could satisfactorily serve the entire field of application. As a result, the standard contains specifications for two reels; one, a small diameter drive reel for low to medium speeds, the other, a large diameter drive reel (NAB hub type) for medium to high speeds.

A1.2 It is to be recognized, due to the two basic types of reels and various flange diameters, that those interchanging tape on reels (or without reels) must have made certain preliminary arrangements of detail before such interchange could be feasible.

A2. Small Diameter Drive Reel

A2.1 The small hub size (2 in.) permits maximum tape capacity for any outside diameter. It is recommended for low to medium speeds because of torque and acceleration limitations (see 2.1.1).

A2.2 It is current practice to use the 2-inch diameter paper core onto which virgin tape is wound as a center *ring*, on which punched paper tape is accumulated for either subsequent reuse or for storage after removal from the take-up reel. The small diameter ($\frac{1}{2}$ inch) drive reel permits continuation of this common practice since the paper core will readily fit over the small hub.

A2.3 The dimensional tolerance requirements for these lower speed reels permit minimum cost manufacturing methods to be employed.

A3. Large Diameter Drive Reel (NAB Hub Type)

A3.1 The 3-inch I.D., $4\frac{1}{2}$ -inch O.D. hub per-

mits take-up of tape at higher speeds:

(1) Approximately 13 in. per revolution at the hub, as against approximately 6 in. per revolution for the 2-inch hub.

(2) The 3-inch diameter drive system provides more secure and more precise coupling between the drive spindle and the tape reel.

A3.2 The 3-inch diameter drive configuration is standard (NAB) for magnetic tape reels and this drive concept can be carried over into paper tape reels with relatively minor modifications of existing tape drive systems.

A3.3 The $4\frac{1}{2}$ -inch diameter outer surface of the hub is also well established in magnetic tape handling devices. Adapter rings, designed to facilitate securing the tape to the reel and to permit interchange of accumulated rolls of tape, are available for the $4\frac{1}{2}$ -inch hub.

A3.4 The $4\frac{1}{2}$ -inch hole of the accumulated roll of perforated tape wound on the large diameter drive reel is completely compatible with present-day center unwinder techniques.

A3.5 The needs for closer dimensional tolerances and more careful dynamic balancing of the large diameter drive reel will result in its being somewhat more costly than the small diameter drive reel.

A4. Interchange Between Reel Sizes

It is possible to achieve the goal of interchange of tape rolls between equipments and still retain the benefits peculiar to each of the two reels as follows:

(1) An equipment with $\frac{1}{2}$ -inch drive spindle can accommodate both reels by use of a $\frac{1}{2}$ -inch to 3-inch *adapter* for the NAB type reel.

(2) An equipment with 3-inch drive spindle cannot accommodate a $\frac{1}{2}$ -inch drive reel but it *can* accommodate a roll of tape with a $4\frac{1}{2}$ -inch *hole*. For example, tape may be wound on a $\frac{1}{2}$ -inch drive reel equipped with an adapter to increase the hub size from 2 to $4\frac{1}{2}$ in.

(3) Many modes of operation with punched paper tape require that the accumulated tape be retransmitted. Since the beginning of a "message" is usually at the core of the roll of tape it is necessary to "center unwind." A minimum 3-inch core is the presently accepted practice for this application. The 2-inch hub of the small diameter reel can be readily expanded to 3 in. by using an adapter.

A5. Specification of Tape Length

Whereas several volumes of capacity are indicated by the permissible diameters (see 2.2.8 and 3.2.8), the tape capacity is not considered a part of this standard since the factors which contribute to the amount of tape reeled are varied and not possible to control under this standard.

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X3.8-1965	Interchangeable Perforated Tape Variable Block Format for Contouring and Contouring Positioning Numerically Controlled Machine Tools
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X3.10-1966	Basic FORTRAN
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X3.12-1966	Vocabulary for Information Processing
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